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EFFORTS SINCE CHERNOBYL DISASTER AND LESSONS
LEARNED**

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INTELLIGENCE REPORT CLASS ~~S E C R E T~~--WNINTEL--NOFORN DIST: 2 FEBRUARY 1994 (b)(1)
COUNTRY: UKRAINE/RUSSIA/BELARUS SUBJ: STATUS OF ENVIRONMENTAL (b)(3)
REMEDATION EFFORTS SINCE CHERNOBYL DISASTER AND LESSONS LEARNED

SUMMARY: ALTHOUGH GENERAL
POLLUTION CONTROL STANDARDS ARE HIGHER IN THE WEST, SCIENTISTS IN UKRAINE,
RUSSIA, AND BELARUS ARE FURTHER AHEAD IN UNDERSTANDING THE EFFECTS OF
AND THE APPROPRIATE RESPONSE TO A MAJOR NUCLEAR ACCIDENT. THE SCALE OF
CONTAMINATION FROM CHERNOBYL, TOGETHER WITH THE LACK OF RESOURCES,
COORDINATION, AND EDUCATION, HAS FORCED EACH COUNTRY TO FOCUS ON
MITIGATING THE RADIATION EFFECTS ON CRITICAL FOOD SUPPLIES RATHER THAN ON
ENVIRONMENTAL REMEDIATION. AS A RESULT, PROGRESS TO DATE HAS BEEN LIMITED,
AND OFFICIALS OF THE FORMER SOVIET UNION CONTINUE TO LOOK TO THE WEST FOR
ASSISTANCE, PARTICULARLY WITH RESPECT TO MODERN EQUIPMENT FOR
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CENTRAL INTELLIGENCE AGENCY

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REPORT CLASS S E C R E T--WNINTEL--NOFORN

DIST: 2 FEBRUARY 1994

COUNTRY: UKRAINE/RUSSIA/BELARUS

SUBJ: STATUS OF ENVIRONMENTAL REMEDIATION EFFORTS SINCE
CHERNOBYL DISASTER AND LESSONS LEARNED

DOI: [REDACTED]

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SOURCE: [REDACTED]
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SUMMARY: ALTHOUGH GENERAL POLLUTION CONTROL STANDARDS ARE HIGHER IN THE WEST, SCIENTISTS IN UKRAINE, RUSSIA, AND BELARUS ARE FURTHER AHEAD IN UNDERSTANDING THE EFFECTS OF AND THE APPROPRIATE RESPONSE TO A MAJOR NUCLEAR ACCIDENT. THE SCALE OF CONTAMINATION FROM CHERNOBYL, TOGETHER WITH THE LACK OF RESOURCES, COORDINATION, AND EDUCATION, HAS FORCED EACH COUNTRY TO FOCUS ON MITIGATING THE RADIATION EFFECTS ON CRITICAL FOOD SUPPLIES RATHER THAN ON ENVIRONMENTAL REMEDIATION. AS A RESULT, PROGRESS TO DATE HAS BEEN LIMITED, AND OFFICIALS OF THE FORMER SOVIET UNION CONTINUE TO LOOK TO THE WEST FOR ASSISTANCE, PARTICULARLY WITH RESPECT TO MODERN EQUIPMENT FOR RADIOLOGICAL SCREENING.

TEXT: 1. GOVERNMENT OFFICIALS AND SCIENTISTS IN UKRAINE, BELARUS, AND RUSSIA HAVE LEARNED MUCH ABOUT THE ENVIRONMENTAL, AGRICULTURAL, AND HEALTH EFFECTS OF RADIOACTIVE CONTAMINATION AS A RESULT OF THE 1986 CHERNOBYL DISASTER. UKRAINE SUFFERED SUBSTANTIALLY GREATER DAMAGE IN THE VICINITY OF CHERNOBYL; HOWEVER, BELARUS CLAIMS THE LARGEST CONTINUING ECONOMIC IMPACT. MOST OF THE CONTAMINATION IN RUSSIA IS LIMITED TO THE KALUGA REGION, AND THAT AREA IS HIGHLY CONTAMINATED. THE ADJACENT VORONEZH REGION ALSO HAS CONTAMINATION FROM CHERNOBYL, AS WELL AS HEAVY METAL CONTAMINATION FROM INDUSTRIAL SOURCES.

2. [REDACTED]

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[REDACTED] THE EFFECTIVE CONTROL OF VAST AREAS IS IMPRACTICAL BECAUSE GOVERNMENTS CANNOT AFFORD TO LET VALUABLE FARMLAND LIE IDLE. IN UKRAINE, FOR EXAMPLE, FOUR MILLION HECTARES OF LAND ARE PRESENTLY BEING WORKED DESPITE RELATIVELY HIGH CONTAMINATION LEVELS. MOREOVER, THE LARGE NUMBER OF

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UNEDUCATED AND UNTRUSTING PEASANTS REVERTING BACK TO THEIR AGRICULTURAL LIFESTYLE AND THEIR PEDDLING OF FRUIT AND VEGETABLES THROUGHOUT THE REGION MAKE IT IMPOSSIBLE TO PHYSICALLY LIMIT ACCESS TO THE REGION. THE PICKING OF WILD MUSHROOMS IS STILL A PERSISTENT CUSTOM, ALTHOUGH SCIENTISTS HAVE DISCOVERED THAT THESE FUNGI ARE AMONG THE MOST EFFICIENT ABSORBERS OF CONTAMINATION. ONLY IN THE COMPARATIVELY SMALL CHELYABINSK REGION HAS THE RADIOACTIVE AREA BEEN SATISFACTORILY ISOLATED AND AGRICULTURAL ACTIVITIES PROHIBITED [REDACTED] COMMENT: ALTHOUGH UKRAINIAN OFFICIALS DENY THAT FOOD GROWN INSIDE CONTAMINATED REGIONS WAS ALLOWED TO BE SOLD OUTSIDE, MANY VEHICLES CARRYING PRODUCE WERE OBSERVED ON ROADS LEADING OUT OF THE AREA.)

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3. IN OTHER AREAS WHERE CONTAMINATION HAS BEEN NOTED, GOVERNMENTS HAVE CHOSEN TO PURSUE THE PROCESS OF TEACHING FARMERS HOW TO GROW SAFE FOOD WHILE AT THE SAME TIME MONITORING FOOD, LIVESTOCK, AND HUMAN DEVELOPMENTS THROUGHOUT THE TERRITORY FOR CONTROL PURPOSES. SCIENTISTS HAVE LEARNED A GREAT DEAL ABOUT THE MANAGEMENT OF CONTAMINATED LAND AND THE CONTROL OF CONTAMINATE UPTAKE THROUGH SOIL CHEMISTRY AND SPECIES SELECTION. THEY ARE ATTEMPTING TO CONTROL UPTAKE RATES USING LIME, WATER, AND FERTILIZER. ACCORDING TO SCIENTISTS AT RUSSIA'S INSTITUTE FOR AGRICULTURAL RADIOLOGY, THE INSTITUTE'S KNOWLEDGE OF UPTAKE RATE BY SPECIES IS EXTENSIVE AND, IN CONJUNCTION WITH SOIL NUTRITION AND WATER, IS IMPORTANT FOR BIOREMEDIATION EFFORTS. IN ADDITION TO MUSHROOMS, LUPINES, AMARANT, BEET ROOT, AND CRANBERRIES HAVE BEEN IDENTIFIED AS HIGHLY ABSORBENT, WHILE FLAX STEM HAS EXHIBITED A LOW RATE OF UPTAKE.

4. [REDACTED]

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[REDACTED] PLANTS MAY REQUIRE 100 YEARS TO REMOVE SOIL CONTAMINANTS BY THEMSELVES. THUS, SCIENTISTS ARE LOOKING FOR METHODS OF PROCESSING THAT CAN PRODUCE SAFE FOODS FROM CONTAMINATED AREAS. IN UKRAINE, A SIGNIFICANT EFFORT IS BEING MADE TO DEVELOP NEW MECHANIZED TECHNIQUES AND CROPS WHICH MAY BE TENDED AND HARVESTED WITH MINIMAL WORKER EXPOSURE AND MIGRATION OF RADIONUCLIDES. ACCORDING TO THE DIRECTOR OF THE INSTITUTE OF AGRICULTURE IN KORYSTEEN, A BREAKPOINT OF 15 CI/KM2 FOR CESIUM IS THE MAXIMUM SAFE LEVEL FOR PRODUCTION OF ACCEPTABLE CROPS BY PRESENT TECHNIQUES. THE USE OF POTASSIUM-BASED FERTILIZERS, LIMING, DEEP PLOWING (WHERE POSSIBLE), AND THE USE OF UNCONTAMINATED FODDER FOR MEAT CATTLE AND BUTTER PRODUCTION SIGNIFICANTLY REDUCE THE DEGREE OF CESIUM CONTAMINATION. SUCH MEASURES MUST BE CONTINUED INDEFINITELY, HOWEVER, BECAUSE PLANTS BEGIN TAKING UP RADIATION AGAIN WHEN TREATMENTS ARE STOPPED.

5. SCIENTISTS IN ALL THREE COUNTRIES IDENTIFY RAPID FIELD SCREENING TECHNIQUES AND EQUIPMENT AS THEIR GREATEST NEEDS; CESIUM, STRONTIUM, AND HEAVY METAL CONTAMINATION ARE THEIR MOST COMMON CONCERNS. THEY REQUIRE ACCURATE MEASUREMENTS OF SOILS AND WATER AS WELL AS SCREENING OF FOOD AND FEED FOR LIVESTOCK. OFFICIALS HIGHLIGHTED THEIR NEED FOR GEOGRAPHIC INFORMATION

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SYSTEMS IN ORDER TO OBTAIN RELEVANT AND ACCURATE MAP INFORMATION ON THE IMMENSE AREAS INVOLVED.

6. [REDACTED]
[REDACTED] PROTECTION OF THE POPULATION FROM THE CONSEQUENCES OF CHERNOBYL, CONTINUED MONITORING IS NECESSARY BECAUSE OF THE SPREAD OF SR-90 CONTAMINATION RESULTING FROM RECENT FLOODING OF THE PRIPYAT AND OTHER RIVERS. IN FACT, THE LEVEL OF SR-90 CONTAMINATION IN RIVERS HAS RISEN RATHER THAN FALLEN IN THE YEARS FOLLOWING THE DISASTER BECAUSE OF CONTINUING RUNOFF FROM THE SURROUNDING LAND. PRISTER AND OTHER OFFICIALS WERE RELUCTANT TO DISCUSS CURRENT ACTIVITIES AT THE CHERNOBYL REACTOR SITE, CLAIMING THAT THIS INFORMATION IS A STATE SECRET.

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7. THE EXTENT OF THE SCREENING AND MONITORING TASK HAS RAISED INTEREST IN MOBILE LABS. [REDACTED]

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[REDACTED] RUSSIA HAS DEPLOYED MOBILE LABS, BUT THE EQUIPMENT IT HAS IS OLD, AND ITS PRIMARY VEHICLE IS TOO LARGE FOR COUNTRY ROADS. RUSSIAN AND UKRAINIAN OFFICIALS WANT THREE MOBILE TESTING LABS OF THE KIND CONFIGURED BY THE U.S. DEPARTMENT OF ENERGY'S AMES LAB. RUSSIAN ACADEMY OF AGRICULTURAL SCIENCE OFFICIALS PLAN TO EQUIP A TRAIN WHICH WILL BE BASED IN MOSCOW. IT WILL HAVE CARS DEVOTED TO RADIONUCLIDE MEASUREMENTS, BIOMONITORING, COMPUTERS, COMMUNICATIONS, AND PERSONNEL QUARTERS. ACCORDING TO PROFESSOR GRIGORIY ((BARENBOYM)), DIRECTOR OF THE RUSSIAN BRANCH OF THE INTERNATIONAL CENTER OF SCIENTIFIC CULTURE, THIS CONCEPT IS BEING TESTED NEAR KALUGA IN THE VORONEZH REGION.

8. BELARUS, WHICH SUPPORTS ITS AGRICULTURE-RELATED LABS SOMEWHAT BETTER THAN THE OTHER COUNTRIES, HAS INDICATED A DESIRE FOR SIMILAR U.S. AID. BELARUSSIAN STANDARDS FOR OCCUPATION IN AFFECTED AREAS AND FOR CONTAMINATION IN FOOD ARE MORE CONSERVATIVE THAN UKRAINE'S. [REDACTED]

[REDACTED] EVACUATION WAS MANDATORY IN AREAS WITH GREATER THAN 40 CI/KM2 OF CESIUM, AND NO AGRICULTURE IS PERMITTED IN AREAS WITH MORE THAN 0.1 CI/KM2 OF PLUTONIUM.

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9. ONE OF THE IDEAS EXPRESSED BY THE SCIENTISTS WAS THE USE OF MOBILE LABS FOR FOOD MONITORING. [REDACTED]

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[REDACTED] SCIENTISTS WOULD LIKE TO BE ABLE TO DRIVE INTO A VILLAGE AND ASK RESIDENTS TO BRING THEIR HOME-GROWN PRODUCE TO A TRAILER WHERE THEY WOULD HAVE TO WAIT ONLY A FEW MINUTES FOR THE RESULTS. HE ADMITS THAT GAINING POPULAR TRUST FOR THE WORDS AND DEEDS OF THE GOVERNMENT FOLLOWING THE DISASTER AND SUBSEQUENT EVENTS IS IMPORTANT.

10. AGGRAVATING EFFORTS TO ACCOMPLISH THESE GOALS ARE THE SEVERE SHORTFALLS IN FUNDING (AND THEREFORE IN PERSONNEL AND EQUIPMENT) AVAILABLE TO AGRICULTURAL SCIENCE INSTITUTES TASKED WITH STUDYING THE PROBLEM. SALARIES ARE LOW, FORCING MANY EXPERTS

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TO PURSUE OTHER EMPLOYMENT. MOST YOUNG SCIENTISTS WILL NOT VOLUNTEER FOR DUTY WITHIN CONTAMINATED AREAS DESPITE PROFITABLE INCENTIVES. LABORATORY EQUIPMENT RESEMBLES EAST GERMAN MODELS OF THE 1950'S. BUDGETS DO NOT ALLOW FOR TRAVEL. AS A RESULT, INSTITUTE OFFICIALS ARE ANXIOUS FOR COOPERATIVE AGREEMENTS IN WHICH THEY COULD SUPPLY EXPERIENCED STAFF, BUT WESTERN COUNTRIES WOULD HAVE TO SUPPLY ALL THE CASH.

11. IN UKRAINE, FOR EXAMPLE, 32 SEPARATE INSTITUTES ARE INVOLVED IN MONITORING AND REMEDIATION OF THESE PROBLEMS, BUT THEIR EFFORT IS NOT COORDINATED, AND THEY HAVE MADE LITTLE IMPROVEMENT. [REDACTED] COMMENT: IT IS UNLIKELY THAT ALL EXPRESSIONS OF INTEREST FOR COOPERATIVE WORK STEM FROM A COMMON, DEEP-SEATED CONCERN FOR ENVIRONMENT AND AGRICULTURE. SCIENTISTS IN ALL THREE COUNTRIES APPEARED SINCERE AND STRESSED VIABLE, WORTHY AGENDAS, BUT SURVIVAL INSTINCTS ARE RUNNING HIGH. GIVEN A BETTER ECONOMIC SITUATION, ONE MIGHT QUESTION WHETHER THEY WOULD HAVE PROPOSED EXACTLY THE SAME PROJECTS.)

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12. REGARDING THE HEALTH EFFECTS OF CONTAMINATION, KIEV'S INSTITUTE OF RADIOLOGY, WHICH HAS DONE ONLY CHERNOBYL-RELATED WORK SINCE 1986, IS PRIMARILY INTERESTED IN THE MEASUREMENT OF BIOAVAILABLE CESIUM, NOT MEASUREMENTS OF RADIATION INTENSITY.

[REDACTED] COW'S MILK IS PERHAPS THE BEST MONITORING SYSTEM FOR BIOAVAILABLE RADIATION. IT IS SIMPLE, READILY AVAILABLE, INEXPENSIVE, AND FAST ENOUGH FOR LONG-RANGE MONITORING. THE INSTITUTE'S STUDIES HAVE DEMONSTRATED THAT THE DEGREE OF BIOAVAILABILITY IS A FUNCTION OF SOIL AND WATER CHARACTERISTICS AND PHYSICAL/CHEMICAL FORMS OF THE FALLOUT. AROUND CHERNOBYL, FALLOUT TOOK TWO FORMS: A CONDENSED FORM WHICH IS SIMILAR TO GLOBAL FALLOUT THAT RESULTS FROM WEAPONS TESTING AND IS WELL UNDERSTOOD, AND A FUEL COMPONENT WHICH CONTAINS HOT PARTICLES WITH TRUE CONTAMINATION UNIQUE TO THE CHERNOBYL ACCIDENT.

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13. [REDACTED] SOFTWARE WHICH COMPUTES THE HEALTH EFFECTS RESULTING FROM RADIATION DOSES IS BASED ON A MODEL DEVELOPED AT CHELYABINSK. THIS MODEL INCORPORATES STUDIES OF TERRAIN AND SOIL TYPES AND ALLOWS FOR DIFFERENT RELEASE LEVELS OF DIFFERENT ELEMENTS AND ISOTOPES UNDER A VARIETY OF METEOROLOGICAL CONDITIONS. [REDACTED] COMMENT: THIS WOULD BE A DIFFICULT AND INEXACT ART. CHELYABINSK PROBABLY REFERS TO THE 1957 ACCIDENT AT THE MAYAK FACILITY AS WELL AS HEAVY METAL CONTAMINATION RESULTING FROM INDUSTRY AND MINERAL REFINING THERE. NO FURTHER INFORMATION WAS OFFERED AS TO THE VALIDATION OF THIS MODEL.)

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14. THE INSTITUTE OF RADIOBIOLOGY IN MINSK IS STUDYING CARDIOVASCULAR EFFECTS DUE TO LOW-LEVEL RADIATION, THYROID CANCER, STEROID AND HORMONAL EFFECTS, AND AUTOIMMUNE DISORDERS. [REDACTED]

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[REDACTED] THESE HAVE BEEN PREVALENT IN VICTIMS OF THE CHERNOBYL ACCIDENT. SIGNIFICANT MEMBRANE DAMAGE HAS ALSO BEEN OBSERVED.

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